# VOLUME CONTENTS

VOLUME 30, NUMBER 1 1990 PAGES 1–204


| | | |
|---|---|---|
| | 1 | Calendar of International Conferences, Symposia, Lectures and Meetings of Interest |
| | 5 | Publications, Notices, Calls for Papers, Etc. |
| | 17 | Announcement |
| R. Venkatapathi Naidu | 19 | NMOS process simulator using Monte Carlo methods |
| S. H. Ahmad | 23 | Enumeration of minimal cutsets of an undirected graph |
| S. Dimitrov | 27 | A conception for reliability prediction and estimation of MOS integrated circuits |
| F. Wurnik | 35 | Sampling analysis in the dpm range |
| D. M. Brkić | 39 | Interval estimation of the parameters $\beta$ and $\eta$ of the two-parameter Weibull distribution |
| U. Sharma, K. B. Misra and A. K. Bhattacharya | 43 | Optimization of CCNs: exact and heuristic approaches |
| D. Simeonov, T. Balabanska and E. Goranova | 51 | Probability approach for investigation of MOST threshold voltage dependence on gate electrode length |
| K. Murari and A. A. Al-Ali | 55 | Two-unit standby reliability system subject to effective and non-effective random shocks |
| L. R. Goel, R. K. Agnihotri and R. Gupta | 61 | Stochastic analysis of a two unit warm standby system with fault detection and inspection |
| B. Colin, J. Goulet and C. Martel | 67 | A note on microprocessor typology |
| B. Wisz | 89 | Thermally conditioned placement optimization of elements in hybrid microcircuits |
| J. Quincké | 105 | Analysis of latch-up neighborhood effects in VLSI CMOS input and output stages |
| A. Scorzoni, G. C. Cardinali, G. L. Baldini and G. Soncini | 123 | A resistometric method to characterize electromigration at the wafer level |
| A. Kyriakoussis and A. S. Papadopoulos | 133 | The logarithmic series distribution as a failure model from the Bayesian point of view |
| M. Smotherman | 141 | Error analysis in analytic reliability modeling |
| K. Teramoto, T. Nakagawa and M. Motoori | 151 | Optimal inspection policy for a parallel redundant system |
| K. F. Kafrawy and A. M. Rushdi | 157 | Uncertainty analysis of fault trees with statistically correlated failure data |
| | 177 | Book Reviews<br>*Numerical Methods with FORTRAN 77. A Practical Introduction*<br>*Probability and Random Processes for Electrical Engineering*<br>*Software Development with Modula-2*<br>*VLSI Electronics Microstructure Science 15. VLSI Metallization*<br>*Polymers in Microelectronics. Fundamentals and Applications*<br>*Computer Architecture and Design*<br>*Gallium Arsenide Digital Integrated Circuits. A Systems Perspective*<br>*Computer-aided Circuit Analysis Using SPICE*<br>*Surface Mount and Related Technologies*<br>*VLSI RISC Architecture and Organization*<br>*Fiber Optic Component Design, Fabrication, Testing, Operation, Reliability and Maintainability* |

189 World Abstracts on Microelectronics and Reliability

i New Patents

VOLUME 30, NUMBER 2 1990 PAGES 205–420

205 Publications, Notices, Calls for Papers, Etc.

211 Bulletin—Society of Reliability Engineers

**Venkatapathi Naidu Rayapati** 213 Modular fault tolerant VLSI parallel processor architectures with dynamic redundancy

**Who Kee Chung** 237 A reliability analysis of a $k$-out-of-$N$:G redundant system with common-cause failures and critical human errors

**Who Kee Chung** 243 Common-cause failures and critical human errors in repairable and non-repairable systems

**L. B. Page and J. E. Perry** 249 Combining vertex decompositions with factoring in an all-terminal network reliability algorithm

**F. Wurnik and W. Pelloth** 265 Functional burn-in for integrated circuits

**C. M. Krishna** 275 Fault-tolerant synchronization using phase-locked clocks

**R. P. Singh and R. B. Misra** 289 Two unit repairable redundant standby system

**A. M. Rushdi** 299 Threshold systems and their reliability

**G. S. Mokaddis, S. S. Elias and E. A. Soliman** 313 A three-unit standby redundant system with repair and preventive maintenance

**G. S. Mokaddis and Kh. M. El-Said** 327 Two models for two unit warm standby redundant system with two different kinds of repair and tolerable time

**B. S. Dhillon and H. C. Viswanath** 375 Bibliography of literature on testability

417 Book Reviews
*Soldering in Electronics*
*System Reliability*

i New Patents

VOLUME 30, NUMBER 3 1990 PAGES 421–628

421 Publications, Notices, Calls for Papers, etc.

**P. K. Kapur, R. B. Garg and V. K. Bhalla** 425 Compound availability measures for a two-unit standby system

**G. S. Mokaddis and Kh. M. El-Said** 431 Two models for two-dissimilar-unit cold standby redundant system with partial failure and two types of repairs

**M. Gururajan and K. Shankar Bhat** 453 A complex priority redundant system with phase type distribution

**D. Kumar, Jai Singh and P. C. Pandey** 457 Cost analysis of a multi-component screening system in the paper industry

**J. P. Singh Joorel** 463 MTSF and availability analysis of a complex system composed of two subsystems in series subjected to random shocks with single repair facility

**C. P. L. Srivastava and S. R. Srivastava** 467 Testing equality of means in a bivariate normal population under possible presence of correlation coefficient

**S. K. Singh and R. P. Singh** 473 Analysis of a protective system having two types of failure

| | | |
|---|---|---|
| **Huang Xizi** | 481 | The limit condition of some time between failure models of software reliability |
| **E. J. Vanderperre** | 487 | Reliability analysis of a warm standby system with general distributions |
| **E. J. Vanderperre** | 491 | Reliability analysis of a two-unit parallel system with dissimilar units and general distributions |
| **J. Biernat** | 503 | The alternate approach to the reliability modeling of fault masking systems |
| **G. K. Agrafiotis, P. R. Parthasarathy and M. Sharafali** | 507 | Excess repair time for a repairable system |
| **T. I. Sultan** | 511 | Performance control of systems with two decisive factors |
| **T. I. Sultan** | 515 | Estimated costs of system maintenance and repair |
| **E. Yaprak and L. Anneberg** | 519 | Parallelization of expert systems with recursive applications |
| **A. M. Rushdi** | 525 | Star-delta transformations of bidirectional branches in probabilistic flow networks |
| **Y. V. S. Sarma and R. P. Jaju** | 537 | Probabilistic analysis of a two-unit system with 'start-up process time' and imperfect switch |
| **Y. S. Sherif and R. G. Dear** | 545 | Development of a new composite pseudo random number generator |
| **Y. S. Sherif and A. A. Heaney** | 555 | Development of a generic database for CAE/CAD/CAM system at an Air Force facility |
| **Shey-Huei Sheu** | 565 | Periodic replacement when minimal repair costs depend on the age and the number of minimal repair for a multi-unit system |
| **T. N. Issa and D. Hommertzheim** | 573 | Availability measures of human-equipment standby redundant data-flow system with application to NASA deep space station |
| **Who Kee Chung** | 585 | Reliability analysis of a $k$-out-of-$N$:G parallel redundant system with multiple critical errors |
| **M. J. LuValle** | 591 | A note on experiment design for accelerated life tests |
| | 605 | Book Reviews<br>*Reliability Fundamentals*<br>*Lithography in Microelectronics*<br>*VLSI Electronics Microstructure Science. Vol. 21. Beam Processing Technologies*<br>*Particles on Surfaces. Vol. 1. Detection, Adhesion, and Removal*<br>*Applied Electromagnetics in Materials*<br>*Natural Language Processing Technologies in Artifical Intelligence: The Science and Industry Perspective* |
| | 613 | World Abstracts on Microelectronics and Reliability |
| | i | New Patents |


VOLUME 30, NUMBER 4 1990 PAGES 629–834


| | | |
|---|---|---|
| **R. P. Anjard** | 629 | Analytical techniques for the evaluation of co-precipitated materials |
| **R. Kalyan and S. Kumar** | 635 | A study of Protean systems—redundancy optimization in consecutive-$k$-out-of-$n$:F systems |
| **G. S. Hura and E. Docken** | 639 | PROLOG in distributed systems: an overview |
| **R. Gupta, S. Bansal and L. R. Goel** | 649 | Profit analysis of two-unit priority standby system with rest period of the operator |

| | | |
|---|---|---|
| **L. R. Goel, R. Gupta and P. Shrivastava** | 655 | Profit analysis of a two-unit cold standby system with varying physical conditions of the repairman |
| **G. D. Goel and K. Murari** | 661 | Two-unit cold-standby redundant system subject to random checking, corrective maintenance and system replacement with repairable and non-repairable types of failure |
| **I. P. Singh, C. Ram and D. Kumar** | 667 | The service channel subject to breakdown and idleness with bulk service |
| **S. P. Jain and K. Gopal** | 673 | A heuristic method of link reliability assignment for maximal reliability |
| **P. N. Andhare, R. K. Nahar, N. M. Devashrayee, S. Chandra and W. S. Khokle** | 681 | Development and performance characterization of the lightly doped drain MOS transistor |
| **E. V. Prasad and A. K. Sarje** | 691 | Enumeration of multiprocessing events and reliability computation of a multiprocessor system |
| **R. Subramanian and R. Natarajan** | 697 | A two-unit redundant system with different types of failure and "imperfect" repair |
| **U. Sharma, S. C. Panigrahi and R. B. Misra** | 701 | Reliability evaluation of a communication system considering a multistate model |
| **V. M. Cătuneanu, Fl. Popentiu, G. Albeanu, D. Vlasceanu and A. Vătaşescu** | 705 | Optimal topological design of large telephone networks |
| **Shey-Huei Sheu** | 713 | Periodic replacement when minimal repair costs depend on the age and the number of minimal repairs for a multi-unit system |
| **S. Kal, S. Haldar and S. K. Lahiri** | 719 | Slope etching of silicon dioxide |
| **B. S. Dhillon and H. C. Viswanath** | 723 | Bibliography of literature on failure data |
| **A. M. Abouammoh, A. Kanjo and A. Khalique** | 751 | On some aspects of variance remaining life distributions |
| **M. Lehtelä** | 761 | Computer-aided failure mode and effect analysis of electronic circuits |
| **L. R. Jaisingh** | 775 | Characterization of inverse Gaussian and inverted gamma distributions |
| **N. Limnios and O. Theologou** | 781 | Closed-form solution for lifetime distribution of single-component failure delay systems |
| **N. Kaio and S. Osaki** | 785 | Optimum ordering policies with non-linear running and salvage costs |
| **M. A. Manzoul and M. Suliman** | 795 | Neural network for the reliability analysis of simplex systems |
| **M. A. Manzoul and M. Suliman** | 801 | Reliability analysis of TMR systems on neural network |
| **H. Ascher** | 807 | Letter to the Editor—Comment on "The nonhomogeneous Poisson process—a model for the reliability of complex repairable systems" |
| **H. Reiche** | 809 | Society of Reliability Engineers Bulletin |
| | 811 | Book Review<br>*Electronics Reliability and Measurement Technology* |
| | 813 | Calendar of International Conferences, Symposia, Lectures and Meetings of Interest |
| | 817 | Publications, Notices, Calls for Papers, etc. |
| | 823 | World Abstracts on Microelectronics and Reliability |
| | i | New Patents |

VOLUME 30, NUMBER 5 1990 PAGES 835–1018


| | | |
|---|---|---|
| G. Matthaei | 835 | A model for mechanisms in plastic encapsulated microelectronic devices during temperature–humidity tests—I |
| A. Chen, X. Gui and G.-B. Gao | 839 | Modelling of thermal fatigue failure in soft-soldered semiconductor devices using the internal variable method |
| L. R. Goel, R. Gupta and S. E. Moafi B. | 845 | Stochastic analysis of a multi-unit cold standby system working in orbit form |
| O. Martynenko | 851 | The definition of two-phase repair member capacity of complex radioelectronic systems |
| Huang Xizi | 855 | The limit conditions of five failure counting models of software reliability |
| P. P. Gupta, A. Singhal and G. S. Srivastava | 861 | Reliability and MTTF analysis of a three-state multi-component parallel redundant system under overloading effect and waiting |
| P. P. Gupta, S. Sharma and R. K. Sharma | 865 | A two-unit standby power plant with imperfect switching |
| G. C. Sharma | 869 | Stochastic behaviour of a cold standby system with partial failure and slow switching device |
| B. V. S. Sisodia and S. Kumar | 873 | Comparison of some ratio-type estimators |
| Venkatapathi Naidu Rayapati | 877 | VLSI semiconductor random access memory functional testing |
| Yan Chunning and Shi Dinghua | 891 | Classification of fault trees and algorithms of fault tree analysis |
| V. M. Cătuneanu, C. Moldovan, F. Popentiu and G. Albeaňu | 897 | Maintenance philosophy using queueing multilevel stochastic service system |
| C. Canali, E. Corti, F. Magistrali, M. Sangalli, A. Paccagnella, C. Tedesco and M. Vanzi | 903 | Thermally induced parasitic ungated FET in power MESFETs |
| Who Kee Chung | 907 | Reliability analysis of a $k$-out-of-$N$:$G$ redundant system with multiple critical errors |
| G. Gspan and R. Osredkar | 911 | Determination of local stress in PECVD nitride films |
| Y. S. Sherif | 915 | Environmental and technological risks and hazards |
| M. J. Patyra and J. Zabrodzki | 951 | The scaled-down circuit yield improvement by technological centering |
| B. S. Dhillon | 963 | Human error data banks |
| Min-Tsai Lai and J. Yuan | 973 | Optimal replacement policy (N*, n*) for a parallel system with common cause failure and geometric repair time |
| H. Reiche | 983 | Society of Reliability Engineers Bulletin |
| F. Popentiu | 985 | The Romanian Reliability Society |
| R. M. Jacobs | 987 | Conference Report—Reliability and Maintainability Symposium (RAMS 1990) |
| | 993 | Book Reviews<br>*Multilayer Bonding Guide*<br>*Applied Electromagnetics in Materials* |
| | 995 | Calendar of International Conferences, Symposia, Lectures and Meetings of Interest |
| | 999 | Publications, Notices, Calls for Papers, etc. |
| | 1005 | World Abstracts on Microelectronics and Reliability |
| | i | New Patents |

VOLUME 30, NUMBER 6 1990 PAGES 1019–1210


| | | |
|---|---|---|
| | 1019 | Note by the Editor-in-Chief |
| J. Singh, P. C. Pandey and D. Kumar | 1021 | Designing for reliable operation of urea synthesis in the fertilizer industry |
| D. Kumar, J. Singh and P. C. Pandey | 1025 | Design and cost analysis of a refining system in the sugar industry |
| D. Walker and G. S. Hura | 1029 | A tutorial on fault tolerance issues with applications in distributed systems |
| R. Gupta, S. Bansal and L. R. Goel | 1039 | Reliability analysis of a system with a mixture of warm and cold standby |
| S. K. Singh, R. P. Singh and R. B. Singh | 1043 | Switch failure in a two duplex unit standby system |
| K. Nakashima and G. G. Weber | 1049 | A method to test whether a system is near failure |
| R. N. Kulkarni, V. V. S. Sanyasi and A. K. Babar | 1055 | A new empirical distribution for the uncertainty analysis of the top event of a fault tree |
| S. K. Singh, S. K. Upadhyay and U. Singh | 1061 | On the selection of gamma vs exponential distribution and adaptive estimation of the parameters |
| G. D. Goel, R. K. Tuteja and K. Murari | 1065 | Single-unit system with corrective maintenance at random checks governed by probabilities in a geometric progression |
| R. K. Nahar, N. M. Devashrayee, W. S. Khokle and P. J. George | 1071 | On the electrical resistivity and chemical etching of $TiSi_2$ thin films sputtered from a composite target |
| R. K. Arora and S. K. Sharma | 1075 | A unified approach to the development of an exceedingly efficient algorithm for digital filter design |
| R. K. Arora and V. K. Gupta | 1081 | Computer communication networks—a study in the Indian context |
| N. Kareer, P. K. Kapur and P. S. Grover | 1085 | An S-shaped software reliability growth model with two types of errors |
| Jinhua Cao and Yuedong Wang | 1091 | Optimal allocation for a repairable system |
| Qiming He, Yuedong Wang and Daozhi Zhang | 1095 | On the first failure time of two-unit systems in two environments |
| P. Camarda | 1099 | Bounds evaluation of coefficients in the reliability polynomial |
| K. Y. Tong, K. W. Yip and W. M. Fung | 1111 | Electrical characterization of silicon surface after reactive ion etching of silicon dioxide by $CHF_3$ |
| T. Nakagawa, K. Yasui and M. Motoori | 1117 | Optimal fault margin in a computer system |
| R. K. Sah | 1123 | An explicit closed-form formula for profit-maximizing $k$-out-of-$n$ systems subject to two kinds of failures |
| V. Ramachandran and V. Sankaranarayanan | 1131 | Dynamic redundancy allocation using Monte-Carlo optimization |
| V. Ramachandran and V. Sankaranarayanan | 1137 | Prolog representation of reliability networks and evaluation of system reliability |
| K. K. Sharma and R. S. Rana | 1145 | Robustness of sequential gamma life testing procedures |
| S. S. Elias and S. W. Labib | 1155 | Cost analysis of a two-dissimilar unit cold standby redundant system with administrative delay and no priority in repair |
| B. S. Dhillon and H. C. Viswanath | 1179 | On common-cause failures—bibliography |
| H. Reiche | 1197 | Society of Reliability Engineers Bulletin |
| | 1199 | World Abstracts on Microelectronics and Reliability |
| | i | New Patents |
| | I | Title Section, Volume Contents and Author Index, Volume 30, 1990 |